

## **CHAPTER 2.**

### **BASIN CHARACTERISTICS**

#### **2.1 DRAINAGE BASIN AND STREAM REACHES**

##### **2.1.1 Subbasin Boundaries/Characteristics**

The Boise Creek basin was divided into seven subbasins based on topographic information and King County staff input on appropriate areas for simulating flow rates. Figure 2-1 shows the subbasins and stream reaches used for the basin characterization. Table 2-1 lists the area of each subbasin.

TABLE 2-1. BOISE CREEK SUBBASIN AREAS	
Subbasin	Area (acres)
1	874
2	960
3	1,195
4	785
5	534
6	2,257
7	3,256
<b>Total</b>	<b>9,861</b>

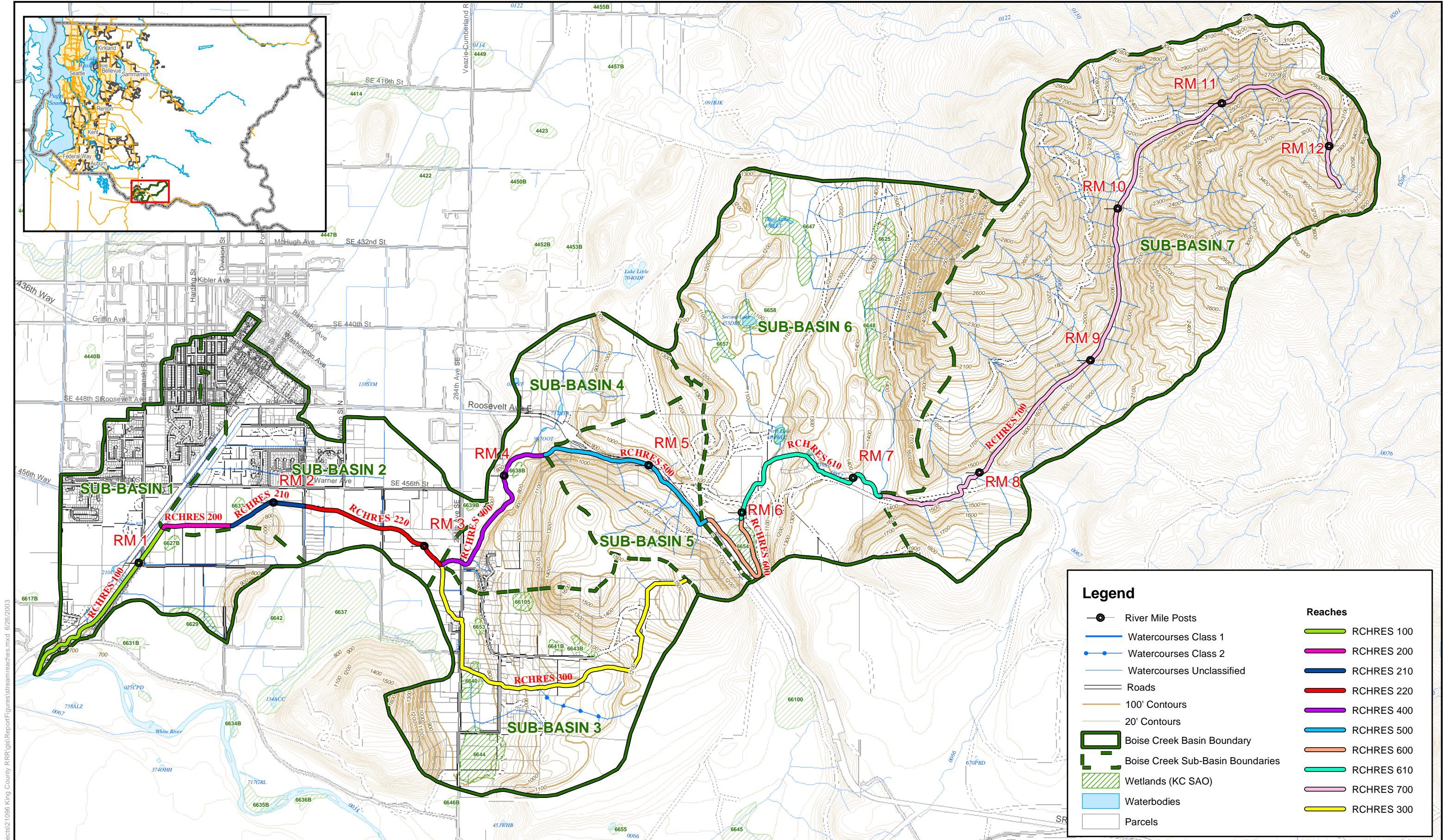
##### ***Subbasin 1***

Subbasin 1 is the most downstream subbasin along Boise Creek and has an area of 874 acres. Elevation in the subbasin ranges from 630 feet at the creek's confluence with the White River, to about 900 feet at a knoll in the subbasin. About half of the subbasin lies within the Enumclaw city limits. Boise Creek has about a 2.2 percent slope through Subbasin 1.

##### ***Subbasin 2***

Subbasin 2 is a 960-acre area immediately upstream of Subbasin 1. About half of the subbasin lies within the Enumclaw city limits. The creek channel through Subbasin 2 was divided into three segments to represent its different channel geometry and channel slope. Elevation in this subbasin ranges from about 720 feet to about 900 feet; most of the subbasin is about 750 feet. The channel slope ranges from 0.2 to 0.5 percent. Significant overbank flooding occurs in this subbasin. A detailed survey is needed to define the 100-year flooding limits. The 100-year depth of flooding was estimated by using an approximate channel cross-section for each of the stream reaches. The calculated 100-year depths for Reaches 200, 210, and 220 are 6.4 feet, 8.3 feet, and 5.8 feet, respectively.



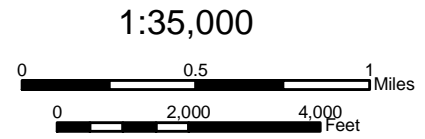


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Source:  
King County GIS, 2002; WSDOT 2002; WDNR



**BOISE CREEK BASIN DELINEATIONS WITH STREAM REACHES**  
**KING COUNTY RAPID RURAL RECONNAISSANCE**  
**Figure 2-1**

**Legend**

- River Mile Posts
- Watercourses Class 1
- Watercourses Class 2
- Watercourses Unclassified
- Roads
- 100' Contours
- 20' Contours
- Boise Creek Basin Boundary
- Boise Creek Sub-Basin Boundaries
- Wetlands (KC SAO)
- Waterbodies
- Parcels

**Reaches**

- RCHRES 100
- RCHRES 200
- RCHRES 210
- RCHRES 220
- RCHRES 400
- RCHRES 500
- RCHRES 600
- RCHRES 610
- RCHRES 700
- RCHRES 300



### ***Subbasin 3***

Subbasin 3 is a 1,195-acre area in the south-central portion of the basin. This subbasin was defined to encompass an unnamed tributary that flows into the left bank of Boise Creek. This subbasin is hilly with elevations ranging from about 760 to about 1,700 feet at Pinnacle Peak Park. 284th Avenue SE is the main east-west road and largest arterial in the subbasin. The channel slope is 8.3 percent from the headwaters to 286th Avenue SE and 1 percent from 286th to Boise Creek.

### ***Subbasin 4***

Subbasin 4 is 785 acres and includes portions of the King County Fairgrounds-, Enumclaw Park, the Enumclaw Golf Course and the Enumclaw Sportsman Park. The channel of Boise Creek within this area has a slope of about 0.7 percent. The elevation ranges from about 760 feet to 1,600 feet. Overbank flooding occurs in the upper reach of Subbasin 4. A detailed survey is needed to define the flooding limits. The 100-year depth of flooding was estimated by using an approximate channel cross-section for this stream reach. Based on this cross-section, the 100-year depth was calculated to be 5.9 feet.

### ***Subbasin 5***

Subbasin 5 is a 534-acre subbasin in the middle of the basin. The elevation varies from about 860 feet to 1,600 feet. Highway 410 parallels Boise Creek through the middle of the subbasin and restricts its lateral movement. The transition from easily developable lowlands to the foothills of the Cascades occurs in this subbasin.

### ***Subbasin 6***

Subbasin 6 is 2,257 acres northeast of Highway 410. It consists of undulating hills with elevations varying from about 1,000 feet to over 3,000 feet. It includes the remnants of the landmark Mill Pond, which for many decades served a lumber processing plant near Highway 410 and was filled in 1994. The subbasin also includes First, Second and Third Lakes, and numerous minor tributaries and wetlands. Few roads exist in the area; most of the subbasin is forested. The channel through this subbasin was divided into two segments representing significantly different channel geometry and slope. The channel slope varies from 0.4 percent to about 5 percent.

### ***Subbasin 7***

Subbasin 7 is 3,256 acres in the easternmost portion of the basin, representing the headwaters of Boise Creek. This basin is situated within the foothills of the Cascade Mountains and contains numerous ravines and minor tributaries that feed Boise Creek. Elevations vary from about 1,300 feet to over 3,900 feet. Several logging roads are located in this subbasin. The subbasin is forested.

## **2.1.2 Stream Reaches**

Boise Creek was divided into 10 segments for use in the HSPF model of the basin. Generally, one segment was defined per subbasin with the exception of Subbasins 2 and 6, where three and two segments, respectively, were defined to represent channel variability. All channel segments, with the exception of the reach for Subbasin 3, represent the main stem of Boise Creek. The channel segment in Subbasin 3 is a tributary to Boise Creek.

Each channel segment was assigned a “RCHRES” number for modeling. Channel geometry for each segment was defined based on available information, including topographic mapping and a site visit. Field surveys were not conducted to determine actual cross-sections. Table 2-2 summarizes key information for each segment. Figure 2-2 depicts the RCHRES routing and the subbasin inflows used in the HSPF model.

TABLE 2-2. BOISE CREEK CHANNEL SEGMENT CHARACTERISTICS			
RCHRES Number	Subbasin	Primary Channel Geometry (feet) <sup>a</sup>	Notes <sup>b</sup>
100	1	6 x 30 x 1	No floodplain storage included.
200	2	5 x 20 x 2	Floodplain storage included.
210	2	6 x 10 x 1.5	Floodplain storage included.
220	2	5 x 20 x 2	Floodplain storage included.
300	3	4 x 4 x 1.5	Floodplain storage included.
400	4	5 x 18 x 1	Floodplain storage included.
500	5	7 x 20 x 1.5	No floodplain storage included.
600	6	10 x 20 x 1.5	No floodplain storage included.
610	6	6 x 10 x 1	No floodplain storage included.
700	7	6 x 8 x 1	No floodplain storage included.
<p>a. Trapezoidal channel, dimensions represent depth, base width and side-slope ratio (horizontal to vertical).</p> <p>b. If required, all channels were extended to convey predicted flood flows by extended the side slopes, with the exception of the noted channels where field observation indicated likely significant floodplain storage.</p>			

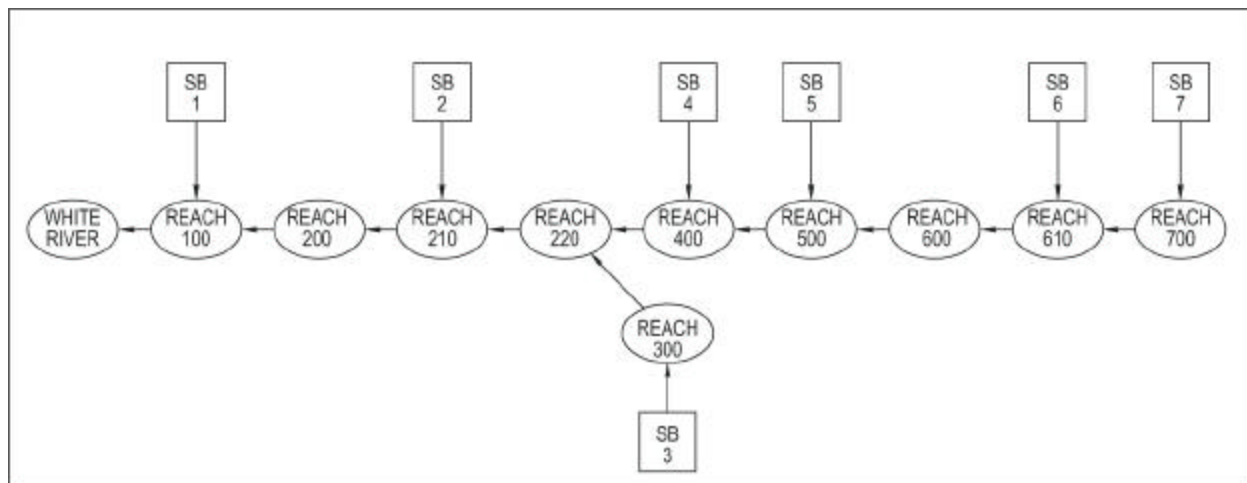


Figure 2-2. Graphic Representation of RCHRES Routing

## 2.2 LAND COVER ANALYSIS

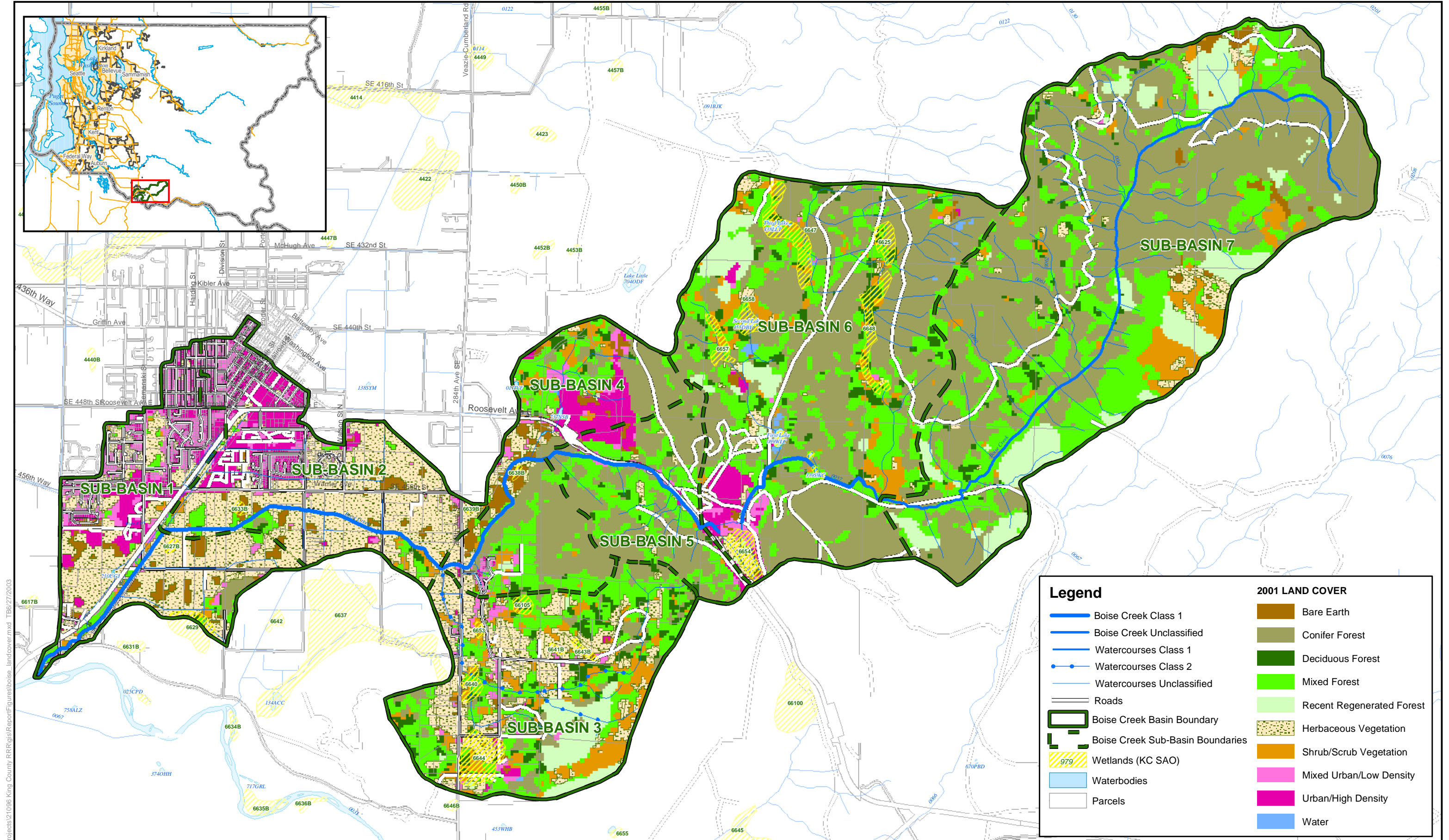
GIS analysis was used to compute the pervious (PERLND) and impervious (IMPLND) land cover area in each subbasin for the HSPF model. The pervious input parameter represents a composite of land cover type, soils, and topography. The impervious areas are based on an effective impervious area (EIA) being applied to each of the land cover types. All data used were provided by King County. Data shape files used to compile land surface types were clipped to the boundaries of the Boise Creek subbasins.

### 2.2.1 Land Cover

Figure 2-3 shows the existing (2001) distribution of the following types of land cover within the basin:

- Urban/High Density Developed
- Mixed Urban/Low Density Developed
- Water
- Bare Earth
- Conifer Forest
- Deciduous Forest
- Mixed Forest
- Recent Regenerated Forest
- Herbaceous Vegetation
- Shrub/Scrub Vegetation.

The GIS land cover types were converted to equivalent HSPF classifications using the equivalencies shown in Table 2-3, which was provided by King County. Table 2-4 lists the EIA defined for each land



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cover type, as provided by King County and modified to represent characteristics of the Boise Creek basin.

TABLE 2-3. PERVIOUS LAND COVER TYPE EQUIVALENCY FOR HSPF	
Land Cover Type from GIS	HSPF Pervious Land Cover Type
Bare Earth	Grass
Mixed Urban / Low Density Developed	90% Grass & 10% Forest
Urban / High Density Developed	90% Grass & 10% Forest
Conifer Forest	Forest
Deciduous Forest	Forest
Mixed Forest	Forest
Recent Regenerated Forest	Forest
Herbaceous Vegetation	Grass
Shrub / Scrub Vegetation	Grass

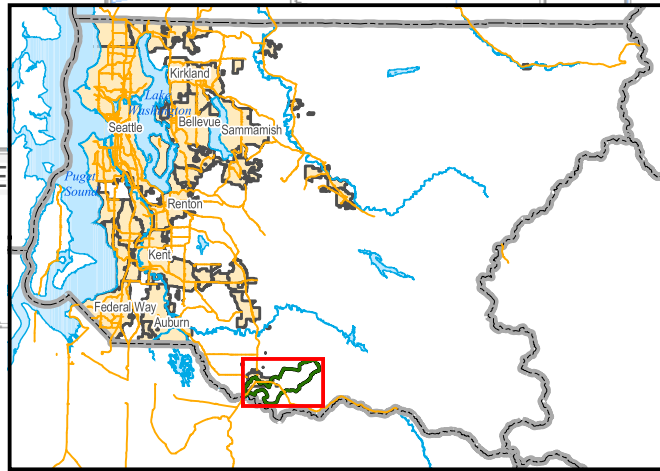
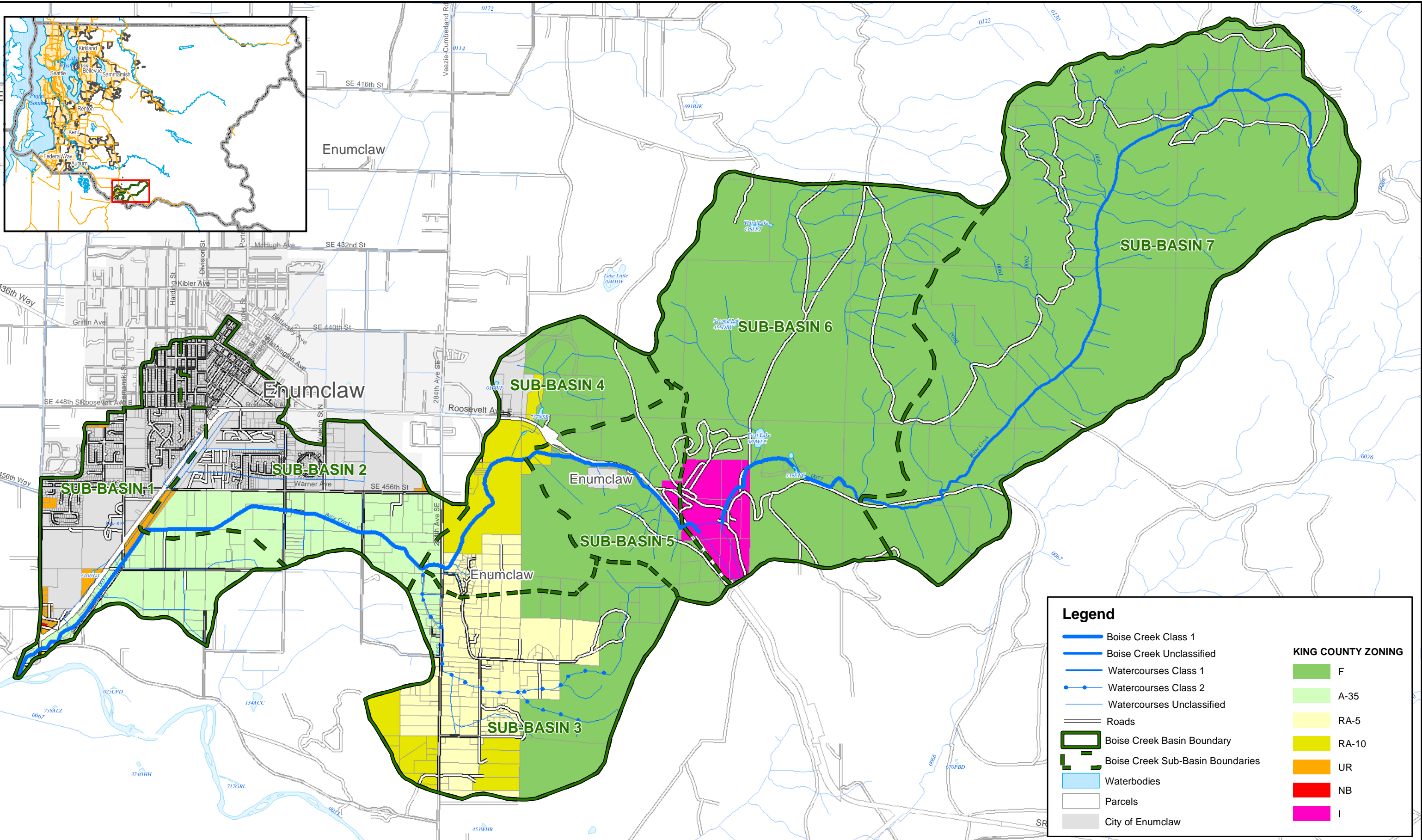
TABLE 2-4. EFFECTIVE IMPERVIOUS AREA (EIA)	
2001 Land Cover Type	EIA
Bare Earth	3%
Conifer Forest	0.5%
Deciduous Forest	0.5%
Herbaceous Vegetation	1%
Mixed Forest	0.5%
Mixed Urban / Low Density	22%
Recent Regenerated Forest	1%
Shrub / Scrub Vegetation	1%
Urban / High Density	85%
Water	100%

Future-condition impervious area was determined by assuming full development to the density allowed by existing zoning. Figures 2-4 and 2-5 show the zoning in the basin, and Table 2-5 lists the EIA for each zoning category, as provided by King County and modified to represent characteristics of the Boise Creek basin.

### 2.2.2 Soils

Figure 2-6 shows soil types in the basin. Portions of Subbasins 1 and 2, in the vicinity of Enumclaw, were not covered by the County-supplied GIS soils file, so hard copies of the King County Soils Survey Maps were used to determine soil types in these areas. Table 2-6 lists the GIS soil type and the associated HSPF soil type.





**Legend**

- Boise Creek Class 1
- Boise Creek Unclassified
- Watercourses Class 1
- Watercourses Class 2
- Watercourses Unclassified
- Roads
- Boise Creek Basin Boundary
- Boise Creek Sub-Basin Boundaries
- Waterbodies
- Parcels
- City of Enumclaw

**KING COUNTY ZONING**

- F
- A-35
- RA-5
- RA-10
- UR
- NB
- I

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**KING COUNTY SOIL SURVEY (NRCS DRAFT DATA)  
(WEST PORTION OF BASIN)**

- AgB - ALDERWOOD GRAVELLY SANDY LOAM, 0 TO 6 PERCENT SLOPES  
AgC - ALDERWOOD GRAVELLY SANDY LOAM, 6 TO 15 PERCENT SLOPES  
AgD - ALDERWOOD GRAVELLY SANDY LOAM, 15 TO 30 PERCENT SLOPES  
AkF - ALDERWOOD AND KITSAP SOILS, VERY STEEP  
BeD - BEAUSITE GRAVELLY SANDY LOAM, 15 TO 30 PERCENT SLOPES  
BeF - BEAUSITE GRAVELLY SANDY LOAM, 40 TO 75 PERCENT SLOPES  
Bu - BUCKLEY SILT LOAM  
EvC - EVERETT GRAVELLY SANDY LOAM, 5 TO 15 PERCENT SLOPES  
EvD - EVERETT GRAVELLY SANDY LOAM, 15 TO 30 PERCENT SLOPES  
Ng - NEWBERG SILT LOAM  
No - NORMA SANDY LOAM  
OvF - OVALL GRAVELLY LOAM, 40 TO 75 PERCENT SLOPES  
Pc - PILCHUCK LOAMY FINE SAND  
Py - PUYALLUP FINE SANDY LOAM  
Rh - RIVERWASH  
Sk - SEATTLE MUCK  
Sm - SHALCAR MUCK  
Su - SULTAN SILT LOAM

**KING COUNTY  
SOIL SURVEY**

**SNOQUALMIE PASS  
SOIL SURVEY**

**SNOQUALMIE PASS SOIL SURVEY (USGS)  
(EAST PORTION OF BASIN)**

- 1 - ALDERWOOD GRAVELLY LOAM, 6 TO 15 PERCENT SLOPES  
2 - ALDERWOOD GRAVELLY LOAM, 15 TO 30 PERCENT SLOPES  
9 - ARENTS, 0 TO 8 PERCENT SLOPES  
10 - BARNESTON GRAVELLY COARSE SANDY LOAM, 0 TO 6 PERCENT SLOPES  
11 - BARNESTON GRAVELLY COARSE SANDY LOAM, 6 TO 30 PERCENT SLOPES  
12 - BARNESTON GRAVELLY COARSE SANDY LOAM, 30 TO 65 PERCENT SLOPES  
39 - CHRISTOFF SANDY LOAM, 6 TO 30 PERCENT SLOPES  
54 - ELWELL SILT LOAM, 6 TO 30 PERCENT SLOPES  
73 - HAYWIRE SANDY LOAM, 30 TO 65 PERCENT SLOPES  
79 - HUMAQUEPTS, 0 TO 5 PERCENT SLOPES  
84 - JONAS GRAVELLY LOAM, TUFF SUBSTRATUM, 15 TO 30 PERCENT SLOPES  
86 - JONAS GRAVELLY SILT LOAM, 15 TO 30 PERCENT SLOPES  
96 - KANASKAT GRAVELLY SANDY LOAM, 0 TO 30 PERCENT SLOPES  
97 - KANASKAT GRAVELLY SANDY LOAM, 30 TO 65 PERCENT SLOPES  
119 - LEMOLO SILT LOAM, 0 TO 8 PERCENT SLOPES  
120 - LITTLEJOHN GRAVELLY SANDY LOAM, 8 TO 30 PERCENT SLOPES  
121 - LITTLEJOHN GRAVELLY SANDY LOAM, 30 TO 65 PERCENT SLOPES  
124 - LITTLEJOHN GRAVELLY SANDY LOAM, TUFF SUBSTRATUM, 30 TO 65 PERCENT SLOPES  
126 - LITTLEJOHN-ROCK OUTCROP COMPLEX, 30 TO 90 PERCENT SLOPES

- 142 - NAGROM SANDY LOAM, 30 TO 65 PERCENT SLOPES  
144 - NAGROM GRAVELLY LOAM, TUFF SUBSTRATUM, 30 TO 65 PERCENT SLOPES  
152 - NIMUE LOAMY SAND, 30 TO 65 PERCENT SLOPES  
158 - NORMA LOAM, 0 TO 3 PERCENT SLOPES  
163 - OGARTY GRAVELLY LOAM, 30 TO 65 PERCENT SLOPES  
172 - OVALL GRAVELLY LOAM, 15 TO 30 PERCENT SLOPES  
173 - OVALL GRAVELLY LOAM, 30 TO 65 PERCENT SLOPES  
188 - PITCHER SANDY LOAM, 8 TO 30 PERCENT SLOPES  
189 - PITCHER SANDY LOAM, 30 TO 65 PERCENT SLOPES  
191 - PITCHER SANDY LOAM, TUFF SUBSTRATUM, 8 TO 30 PERCENT SLOPES  
192 - PITCHER SANDY LOAM, TUFF SUBSTRATUM, 30 TO 65 PERCENT SLOPES  
195 - PITS  
196 - PLAYCO LOAMY SAND, 8 TO 30 PERCENT SLOPES  
197 - PLAYCO LOAMY SAND, 30 TO 65 PERCENT SLOPES  
200 - PLAYCO VERY GRAVELLY LOAMY SAND, TUFF SUBSTRATUM, 30 TO 65 PERCENT SLOPES  
203 - RAGNAR LOAM, 6 TO 15 PERCENT SLOPES  
206 - RAGNAR-LYNNWOOD COMPLEX, 30 TO 45 PERCENT SLOPES  
211 - REICHEL SILT LOAM, 6 TO 30 PERCENT SLOPES  
231 - SEATTLE MUCK, 0 TO 1 PERCENT SLOPES  
235 - SHALCAR MUCK, 0 TO 1 PERCENT SLOPES  
264 - TYPIC HAPLORTHODS, 35 TO 100 PERCENT SLOPES  
267 - UDIFLUENTS, MOIST, 0 TO 8 PERCENT SLOPES  
278 - WINSTON LOAM, 0 TO 8 PERCENT SLOPES  
279 - WINSTON LOAM, 8 TO 30 PERCENT SLOPES  
282 - ZYNBAR LOAM, 6 TO 30 PERCENT SLOPES  
283 - ZYNBAR LOAM, 30 TO 65 PERCENT SLOPES  
285 - WATER

**Legend**

Incorporated Areas

Soils

Boise Creek Basin Boundary

Boise Creek Sub-Basin Boundaries

Wetlands (KC SAO)

Waterbodies

Parcels

Roads

Boise Creek Class 1

Boise Creek Unclassified

Watercourses Class 1

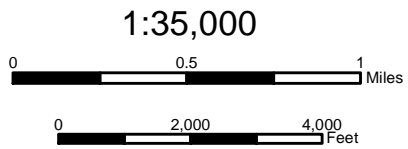
Watercourses Class 2

Watercourses Unclassified



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Source: King County GIS 2002; NRCS 2002; USGS



**BOISE CREEK BASIN - SOILS MAP**  
**KING COUNTY RAPID RURAL RECONNAISSANCE**

**Figure 2-6**

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### 2.2.3 Topography

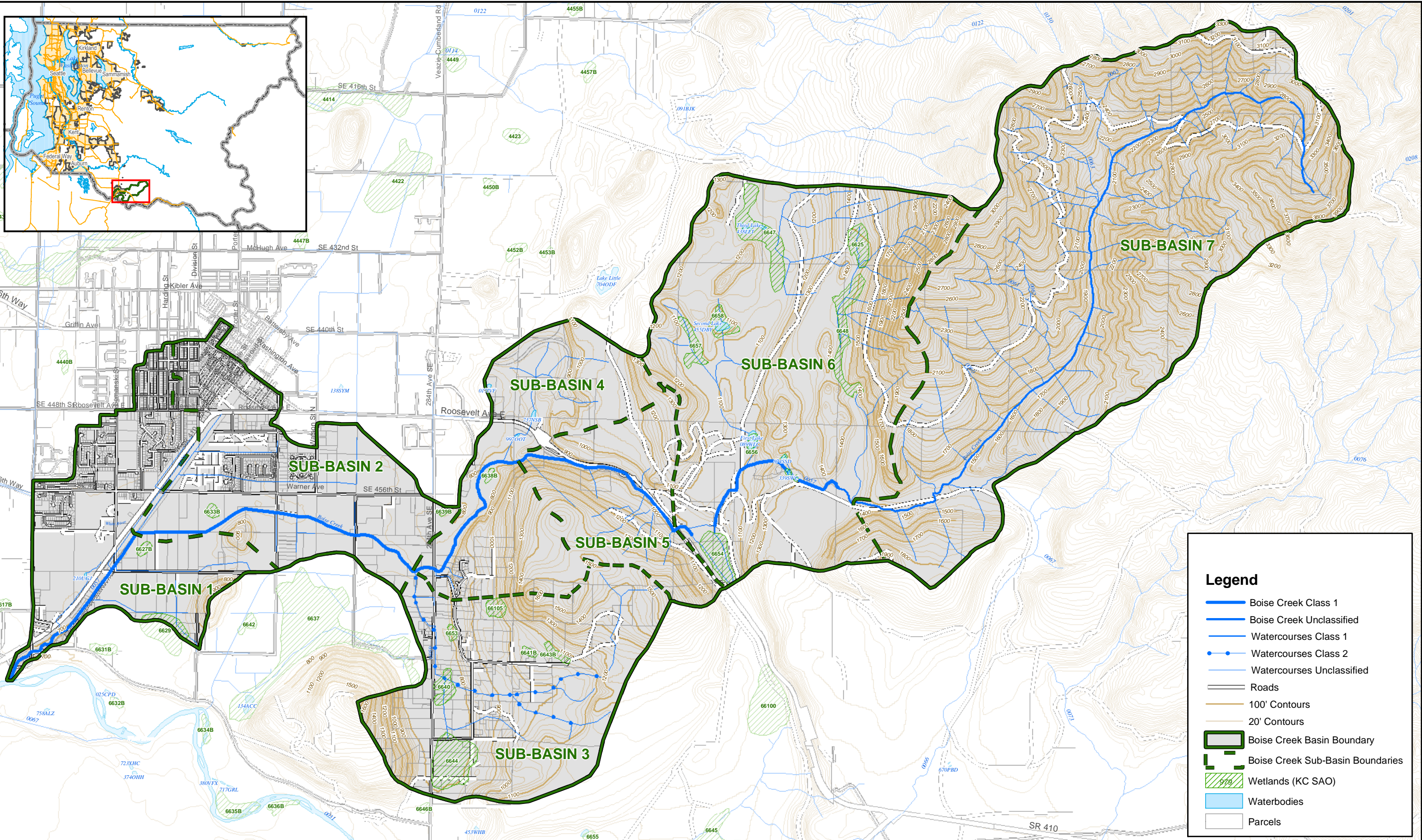
The County-provided GIS file for topography was derived from a GIS surface model and includes six slope categories. Figure 2-7 shows this information. A small portion of the upper reach of Subbasin 7 was classified as “no data.” Based on surrounding characteristics, this area was assigned the HSPF slope classification of “moderate.” Table 2-7 correlates the percent slope provided by King County to an equivalent HSPF slope category.

### 2.2.4 GIS Analysis

GIS overlay analysis of land cover, soil and slope was used to generate an HSPF land surface type layer. The HSPF land surface type layer was then overlaid with the Boise Creek subbasin layer.

TABLE 2-5. EFFECTIVE IMPERVIOUS AREA BY ZONING CODE		
Zoning Code	Description	EIA
<b>King County Zoning Categories</b>		
A-35	Agriculture – 35 acre lot	1.0%
F	Forest	0.0%
RA-5	Rural Area – 5 acre lot size	4.0%
RA-10	Rural Area – 10 acre lot size	2.0%
UR	Urban Reserve	10.0%
NB	Neighborhood Business	85.0%
I	Industrial	85.0%
<b>City of Enumclaw Zoning Categories</b>		
P	Public Use District	4.0%
PUD	Planned Unit Development	40.0%
R-1	SF Residential, min 15,000-square-foot lot, max 3 du/ac	15.0%
R-2	SF Residential, 2.4 to 5.2 du/ac	20.0%
R-3	Mixed Residential, 3.5 to 7 du/ac	33.0%
R-4	Multifamily Residential, 15 to 30 du/ac	56.0%
HCB	Highway & Community Business, 10,000 sf min lot	85.0%
CB-1	Central Business Commercial with on-site parking	85.0%
CB-2	Central Business Commercial w/o on-site parking	85.0%
NB	Neighborhood Business	85.0%
GO	General Office	85.0%
<b>Other Categories</b>		
ROW	Right of Way	85.0%
BSW	Boise Springs Watershed	0
Note: du = dwelling unit		





**Legend**

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- Boise Creek Unclassified
- Watercourses Class 1
- Watercourses Class 2
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- 20' Contours
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- Boise Creek Sub-Basin Boundaries
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- Waterbodies
- Parcels

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There is a potential for 165 unique land surface types (combinations of land cover, soil type and slope). Table 2-8 summarizes the number of unique land surface types in each of the Boise Creek subbasins. The types were aggregated into the 16 HSPF land surface types listed in Table 2-9.

For the predevelopment condition, it was assumed that the entire basin was forested, with the exception of open water, and that all HSPF soil and slope types are the same as for existing conditions. An EIA of 0 percent was applied to all land surface types except open water that was assigned an EIA of 100 percent. Predevelopment wetland areas were based on HSPF soil types classified as saturated.

Tables 2-10, 2-12 and 2-13 summarize land surface types for predevelopment, existing, and future conditions, respectively. Table 2-13 compares the EIA for existing and future land use conditions and lists the percent existing forest cover for each subbasin.

TABLE 2-6.  
SOIL TYPE TRANSFORMATION FOR HSPF

Soil Name (from GIS)	HSPF Soil Type	Soil Name (from GIS)	HSPF Soil Type
Everett	Outwash	Haywire	Bedrock
Aquic Xerofluvents	Outwash	Fluvaquentic Humaquepts	Till
Puyallup	Till	Nagrom	Bedrock
Newberg	Till	Kanaskat	Outwash
Norma	Till	Indianola	Outwash
Seattle	Saturated	Ragnar	Outwash
Buckley	Till	Barneston	Outwash
Sultan	Till	Arents	Outwash
Shalcar	Till	Littlejohn	Bedrock
Alderwood	Till	Pits	Outwash
Beausite	Till	Playco	Outwash
Ovall	Till	Terric Medisaprists	Till
Reichel	Bedrock	Water	Water
Winston	Outwash	Xerochrepts	Till
Jonas	Bedrock	Nimue	Bedrock
Zynbar	Till	Ogarty	Outwash
Christoff	Till	Pitcher	Bedrock

TABLE 2-7.  
SLOPE CATEGORY EQUIVALENCY FOR HSPF

Percent Slope (King County Data)	HSPF Slope
0-10	Flat
10-20	Moderate
20-30	Steep
30-40	Steep
>=40	Steep
no data	Moderate



TABLE 2-8.  
NUMBER OF UNIQUE LAND SURFACE TYPES BY  
SUBBASIN

Boise Creek Subbasins	Number of HSPF Land Surface Types
1	23
2	22
3	51
4	59
5	40
6	85
7	63

TABLE 2-9.  
AGGREGATED LAND SURFACE TYPES  
USED IN HSPF

HSPF Category	Description
TF/Mild	Till Forest Mild Slope
TF/Moderate	Till Forest Moderate Slope
TF/Steep	Till Forest Steep Slope
TG/Mild	Till Grass Mild Slope
TG/Moderate	Till Grass Moderate Slope
TG/Steep	Till Grass Steep Slope
BRF/Mild	Bedrock Forest Mild Slope
BRF/Moderate	Bedrock Forest Moderate Slope
BRF/Steep	Bedrock Forest Steep Slope
BRG/Mild	Bedrock Grass Mild Slope
BRG/Moderate	Bedrock Grass Moderate Slope
BRG/Steep	Bedrock Grass Steep Slope
OF	Outwash Forest
OG	Outwash Grass
Wetlands	Wetlands
Impervious	Impervious

TABLE 2-10.  
PREDEVELOPED LAND SURFACE SUMMARY

Land Surface	Area (acres)							Total
	Subbasin 1	Subbasin 2	Subbasin 3	Subbasin 4	Subbasin 5	Subbasin 6	Subbasin 7	
TF/Mild	824.46	940.12	543.04	151.18	26.19	117.05	102.21	<b>2,704.25</b>
TF/Moderate	21.17	9.45	283.52	106.20	73.81	35.04	145.04	<b>674.23</b>
TF/Steep	28.17	9.08	163.12	159.88	70.01	13.09	31.69	<b>475.04</b>
OF	0	1.74	204.02	357.51	363.50	1,766.69	948.80	<b>3,642.26</b>
BRF/Mild	0	0	0	0	0	4.86	56.27	<b>61.13</b>
BRF/Moderate	0	0	0	0	0	24.86	342.48	<b>367.34</b>
BRF/Steep	0	0	0	0	0	249.42	1,629.78	<b>1,879.20</b>
Wetlands	0	0	0	7.67	0	0	0	<b>7.67</b>
EIA	0.01	0	0.81	2.84	0	45.98	0	<b>49.64</b>
<b>Total</b>	<b>873.81</b>	<b>960.39</b>	<b>1194.5</b>	<b>785.28</b>	<b>533.51</b>	<b>2256.99</b>	<b>3256.20</b>	<b>9,860.76</b>

TABLE 2-11.  
EXISTING (2001) LAND SURFACE SUMMARY

Land Surface	Area (acres)							Total
	Subbasin 1	Subbasin 2	Subbasin 3	Subbasin 4	Subbasin 5	Subbasin 6	Subbasin 7	
TF/Mild	53.37	45.84	216.49	68.64	25.82	93.14	89.08	<b>592.38</b>
TF/Moderate	5.66	4.32	148.67	79.78	72.00	30.76	94.95	<b>436.14</b>
TF/Steep	19.64	5.91	126.06	151.38	67.91	11.49	15.35	<b>397.74</b>
TG/Mild	603.40	678.68	314.75	77.61	0.24	22.73	12.45	<b>1709.86</b>
TG/Moderate	14.66	5.01	125.53	21.71	1.43	3.86	48.90	<b>221.10</b>
TG/Steep	8.14	3.11	35.72	6.57	1.75	1.52	16.09	<b>72.92</b>
OF	0	1.23	138.59	186.85	294.40	1516.10	873.35	<b>3010.52</b>
OG	0	0.51	62.70	103.03	34.11	181.96	69.41	<b>451.72</b>
BRF/Mild	0	0	0	0	0	4.83	51.53	<b>56.36</b>
BRF/Moderate	0	0	0	0	0	24.22	323.79	<b>348.01</b>
BRF/Steep	0	0	0	0	0	237.45	1523.47	<b>1760.92</b>
BRG/Mild	0	0	0	0	0	0	4.33	<b>4.33</b>
BRG/Moderate	0	0	0	0	0	0.50	16.57	<b>17.07</b>
BRG/Steep	0	0	0	0	0	10.01	96.66	<b>106.67</b>
Wetlands	0	0	0	7.53	0	0	0	<b>7.53</b>
EIA	168.92	215.78	26.00	82.18	35.85	118.42	20.34	<b>667.49</b>
<b>Total</b>	<b>873.81</b>	<b>960.39</b>	<b>1194.5</b>	<b>785.28</b>	<b>533.51</b>	<b>2256.99</b>	<b>3256.20</b>	<b>9860.76</b>

TABLE 2-12.  
FUTURE BUILDOUT LAND SURFACE SUMMARY

Zoning Category	Area (acres)							Total
	Subbasin 1	Subbasin 2	Subbasin 3	Subbasin 4	Subbasin 5	Subbasin 6	Subbasin 7	

<b>King County</b>								
A-35	255.20	365.97	33.83	9.73	0	0	0	<b>664.73</b>
F	0	0	444.93	373.00	383.50	1,501.37	2,707.57	<b>5,410.37</b>
RA-5	0	0	354.82	81.47	0	0	0	<b>436.29</b>
RA-10	1.56	9.50	85.71	126.08	1.64	0	0	<b>224.49</b>
UR	30.78	9.48	0	0	0	0	0	<b>40.26</b>
NB	0.69	0	0	0	0	0	0	<b>0.69</b>
I	0	0	0	0	15.11	120.63	0	<b>135.74</b>
<b>City of Enumclaw</b>								
P	162.98	21.20	0	7.50	0	0	0	<b>191.68</b>
PUD	0	109.66	0	0	0	0	0	<b>109.66</b>
R-1	0	82.10	0	0	0	0	0	<b>82.10</b>
R-2	216.31	147.30	0	42.70	0	0	0	<b>406.31</b>
R-3	7.80	9.90	0	0	0	0	0	<b>17.70</b>
R-4	57.25	10.90	0	0	0	0	0	<b>68.15</b>
HCB	4.20	56.60	0	0	0	0	0	<b>60.80</b>
CB-1	0	11.50	0	0	0	0	0	<b>11.50</b>
CB-2	0	8.40	0	0	0	0	0	<b>8.40</b>
NB	0.60	0	0	0	0	0	0	<b>0.60</b>
GO	1.72	0	0	0	0	0	0	<b>1.72</b>
<b>Other Categories</b>								
Boise Springs Watershed	0	0	0	0	15.30	0	0	<b>15.30</b>
ROW	83.00	63.13	22.60	15.15	18.92	4.37	0	<b>207.17</b>
Sensitive Areas	51.73	54.76	252.64	129.63	99.03	630.61	548.66	<b>1,767.06</b>
<b>Total</b>	<b>873.81</b>	<b>960.39</b>	<b>1,194.5</b>	<b>785.28</b>	<b>533.51</b>	<b>2,256.99</b>	<b>3,256.23</b>	<b>9,860.76</b>
EIA (included in above zoning categories) <sup>a</sup>	167.37	219.92	38.62	33.21	33.38	131.73	3.01	627.24
<p>a. For some subbasins, the future EIA, calculated based on zoning designations, is lower than the existing EIA based on GIS land cover data, due to discrepancies between the two sets of data. For the hydrologic analysis performed for this report, when the land cover analysis indicated reduced EIA in the future, the value was kept the same as the existing EIA, on the assumption that impervious area would not be reduced with development to full buildout. Current orthophotos of the basin should be digitized and specific areas computed to correct this discrepancy</p>								

TABLE 2-13.  
EXISTING AND FUTURE EIA, FOREST COVER, AND SUBBASIN CLASSIFICATION

Subbasin	Area (acres)	Percent EIA		Existing Forest Cover		Classification <sup>b</sup>
		Existing	Future <sup>a</sup>	Area (acres)	Percent	
1	873.81	19.3	19.2	16.13	1.8	Impacted
2	960.39	22.5	22.9	9.16	1.0	Impacted
3	1,194.51	2.2	3.2	754.65	63.2	Sensitive



4	785.28	10.5	4.2	558.97	71.2	Impacted
5	533.51	6.7	6.2	489	91.7	Sensitive
6	2,256.99	5.2	5.8	2,026.62	89.8	Sensitive
7	3,256.27	0.6	0.1	3,211.43	98.6	Sensitive
<b>Basinwide</b>	<b>9,860.76</b>	—	—	—	—	—
<p>a. Values of future EIA lower than the existing levels are due to discrepancies between the data used for calculating the two values (see note to Table 2-12).</p> <p>b. Sensitive = 0 – 10% impervious cover; Impacted = 11 – 25% impervious cover; Non-Supporting = &gt;25% impervious cover (from <i>Watershed Vulnerability Analysis</i>)</p>						

### 2.2.5 Riparian Corridor Land Cover Analysis

A 200-foot-wide stream riparian corridor, shown in Figure 2-8, was analyzed for existing land use. Table 2-14 summarizes the existing land cover within this corridor by subbasin. Future land cover in the corridor was not analyzed because it was not feasible to accurately predict the spatial distribution of future development in and along the corridor. It is assumed that sensitive-area regulations will protect the stream corridor in the future. Table 2-15 summarizes the existing land cover for the total Boise Creek subbasin.

### 2.2.6 Conclusions and Recommendations

Basin characteristics were derived from GIS data provided by King County. The effective impervious area was derived from a range of values provided by the County based on land use or zoning. In order to develop a more accurate representation of cover types and EIA, it is recommended that this information be developed from current orthophotos of the basin that could be digitized and specific areas computed.

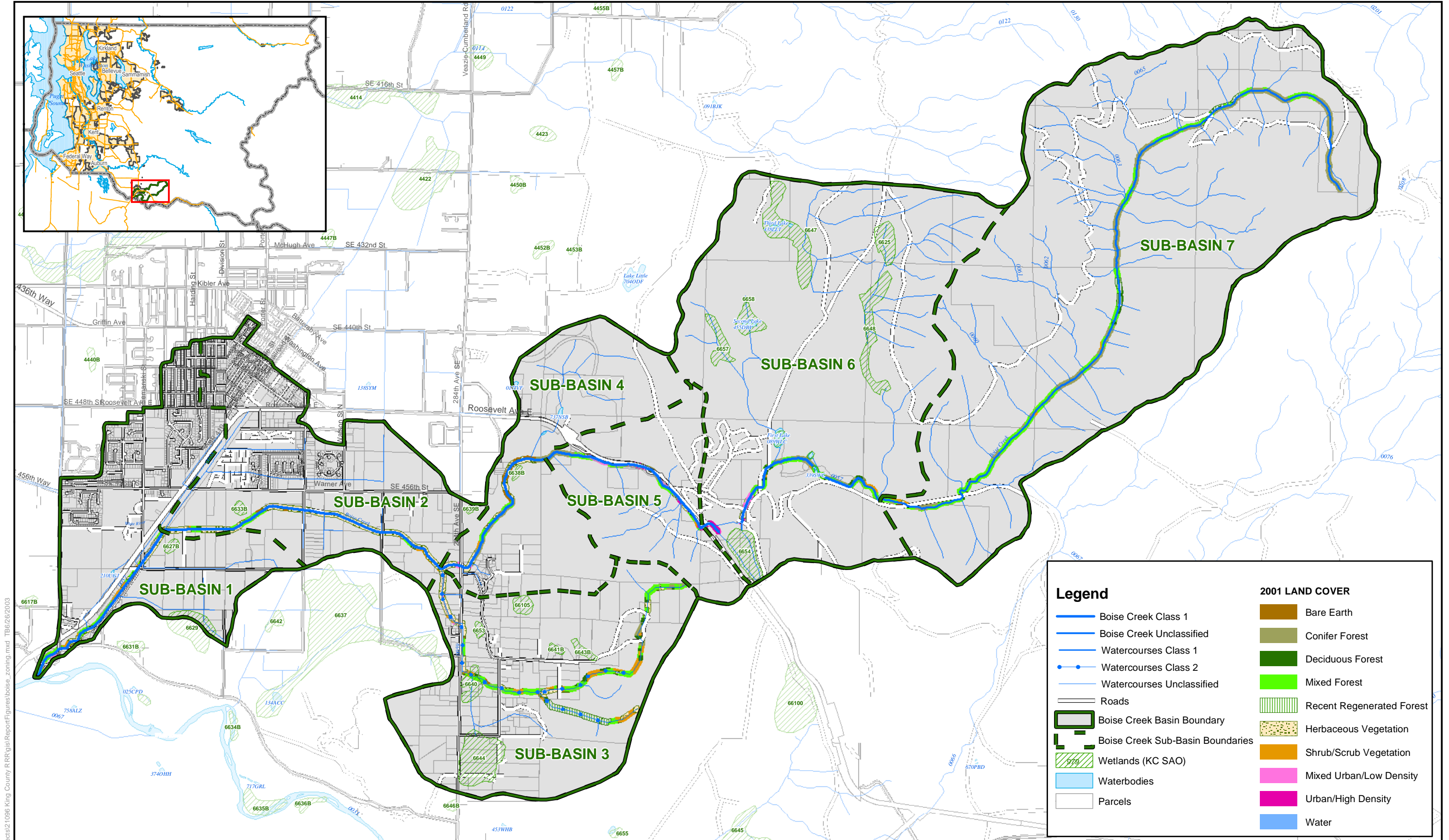


TABLE 2-14.  
EXISTING (2001) LAND SURFACE SUMMARY FOR 200-FOOT RIPARIAN CORRIDOR

Land Surface	Area (acres)							Total
	Subbasin 1	Subbasin 2	Subbasin 3	Subbasin 4	Subbasin 5	Subbasin 6	Subbasin 7	
Bare Earth	0.92	1.03	0.00	5.76	0.00	0.02	0.00	<b>7.73</b>
Coniferous Forest	0.00	0.04	0.00	5.91	6.25	4.86	58.61	<b>75.67</b>
Deciduous. Forest	0.19	0.45	0.00	0.00	0.34	2.60	1.25	<b>4.83</b>
Herbaceous Forest	12.17	35.94	0.20	10.17	0.98	1.87	0.16	<b>61.49</b>
Mixed Forest	12.30	6.49	0.00	4.32	8.41	16.65	53.65	<b>101.82</b>
Recent Regenerated Forest	0.00	0.00	0.00	0.00	0.00	0.00	5.96	<b>5.96</b>
Mixed Urban/Low Density	0.62	0.00	0.00	1.32	7.47	3.22	0.00	<b>12.63</b>
Scrub/Shrub	4.09	1.77	0.00	0.74	0.70	2.50	2.44	<b>12.24</b>
Urban High Density	0.00	0.00	0.00	0.00	4.72	3.20	0.00	<b>7.92</b>
Water	0.01	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.01</b>
<b>Total</b>	<b>30.30</b>	<b>45.72</b>	<b>0.20</b>	<b>28.22</b>	<b>28.87</b>	<b>34.92</b>	<b>122.07</b>	<b>290.30</b>

TABLE 2-15.  
EXISTING (2001) LAND SURFACE SUMMARY FOR THE BOISE CREEK SUBBASIN

Land Surface	Area (acres)							Total
	Subbasin 1	Subbasin 2	Subbasin 3	Subbasin 4	Subbasin 5	Subbasin 6	Subbasin 7	
Bare Earth	47.11	37.27	14.02	57.41	4.62	14.93	35.65	<b>211.00</b>
Coniferous Forest	15.76	3.87	99.56	282.94	268.94	1210.56	1819.86	<b>3701.49</b>
Deciduous. Forest	2.87	4.93	98.99	24.72	11.95	103.7	61.91	<b>309.07</b>
Herbaceous Forest	421.79	543.0	341.87	74.95	12.07	69.46	83.26	<b>1546.39</b>
Mixed Forest	43.75	37.58	319.76	176.071	179.11	514.80	773.54	<b>2044.62</b>
Recent Regenerated Forest			111.99	2.59	0.66	100.75	332.74	<b>548.73</b>
Mixed Urban/Low Density	185.43	100.76	39.86	38.99	16.35	40.67	0.97	<b>423.04</b>
Scrub/Shrub	13.52	13.33	159.08	48.44	4.94	124.27	148.18	<b>511.76</b>
Urban High Density	143.58	219.65	8.57	77.71	34.86	62.62	0.16	<b>547.15</b>
Water	0.01		0.81	1.46		15.23		<b>17.51</b>
<b>Total</b>	<b>873.81</b>	<b>960.39</b>	<b>1194.51</b>	<b>785.28</b>	<b>533.51</b>	<b>2256.99</b>	<b>3256.27</b>	<b>9860.75</b>